UNIVERSITI TEKNOLOGI MARA

POTENTIAL OF CASSAVA STEM AS A PARTICLEBOARD RAW MATERIAL

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MSc

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AUTHOR’S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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ABSTRACT

Cassava *(Manihot esculenta Crantz sp)* stems residues were mostly abandoned due to improper waste management in agricultural field after its roots were harvested. Study on the fundamental properties of cassava and information gained could assist on its application as particleboard. In this research, physical and chemical properties of cassava stems were assessed. Physical properties involved were moisture content, specific gravity together with shrinkage and swelling while chemical properties tested were lignin content, hot water solubility, alcohol-toluene solubility, 1% sodium hydroxide test, holocellulose content and ash content. Particleboards were fabricated from it and basic properties were related with the board's physical and mechanical properties. 7%, 10% and 13% resin content were used according to the locations along the stem height (top, middle, and bottom). From the chemical analysis, the extractive contents (alcohol toluene and hot water), holocellulose, lignin and ash content show a higher value in bottom part. Moisture content reading from the green wood cassava stems samples indicate that the moisture in all parts are high. Maximum reading of green wood and oven dried wood shows that highest reading can both be seen in bottom location. Specific gravity has no significant effect between locations along the stem height although middle displays the highest reading. Same goes with shrinkage and swelling rate of cassava stems, it does not have a significant effect with each other even though tangential has the highest rate in shrinkage and radial for swelling. Cassava stem-based particleboard demonstrates that higher resin will increase the strength according to MOR, MOE, and internal bond besides decreasing the board's water absorption rate and thickness swelling.

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